



# **SEM Committee Paper**

## **Trading and Settlement Code**

### **Policy Parameters 2017**

#### **Consultation Paper**

**SEM-16-034**

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## Contents

1	Introduction .....	3
2	PCAP .....	5
3	PFLOOR .....	9
4	Uplift Parameters .....	11
5	Proposed Parameters for 2017 .....	15

## 1 INTRODUCTION

1.1.1 The SEM Trading and Settlement Code (the Code) sets out a number of policy parameters which are determined by the Regulatory Authorities (RAs) on an annual basis.

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### 1.2 VOLL / PCAP / PFLOOR

1.2.1 In accordance with paragraph 4.12 and 4.95 of the Code, the RAs are required to determine the following three administered prices:

- the Value of Lost Load (VOLL);
- the Market Price Cap (PCAP); and,
- the Market Price Floor (PFLOOR).

1.2.2 Following consultation last year, the RAs decided (SEM-15-042) for the period from 1st January 2016 to 31st December 2016 that:

- PCAP will remain unchanged at €1,000/MWh;
- PFLOOR will remain unchanged at minus €100/MWh.

1.2.3 This Consultation Paper undertakes a review of the effectiveness of PCAP and PFLOOR with a view to setting the values for 2017.

1.2.4 The calculation of VOLL for 2017, using the methodology decided upon in 2007, will be published later in the year, to meet the requirement in paragraph 4.95 of the Code.

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### 1.3 UPLIFT PARAMETERS

1.3.1 Under paragraphs 4.70 and 4.71 of the Code, the RAs are also required to determine three parameters used in the calculation of Uplift<sup>1</sup>. These are:

- The Uplift Alpha value  $\alpha$ , which governs the importance of the Uplift Cost Objective, such that  $0 \leq \alpha \leq 1$ ;
- The Uplift Beta value  $\beta$ , which governs the importance of the Uplift Profile Objective, such that  $0 \leq \beta \leq 1$  and such that  $\alpha + \beta = 1$ ; and
- The Uplift Delta value  $\delta$ , to constrain the overall impact on revenue in each Trading Day  $t$  arising from the Uplift calculation, such that  $\delta \geq 0$ .

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<sup>1</sup> For more on the background to the methodology and objectives of Uplift in the SEM see the following: Objectives of the Function to Include Start-Up and No-load Costs in SMP(AIP/SEM/92/06), SMP Uplift Objectives – Decision Paper (AIP/SEM/142/06), SMP Uplift Parameters Consultation (AIP/SEM/230/06), and SMP Uplift Methodology and Parameters – Decision Paper (AIP/SEM/51/07)

1.3.2 Following consultation, the RAs last year decided (SEM-15-042) for the period from 1<sup>st</sup> January 2016 to 31<sup>st</sup> December 2016 that:

- $\alpha$  should be set to a value of 0.1;
- $\beta$  should be set to a value of 0.9; and,
- $\delta$  should be set to a value of 5.

1.3.3 As stated in previous consultations, the RAs intend to monitor the effectiveness of the proposed Uplift Methodology. This paper presents some analysis of the behaviour of Uplift for the period May 2015 to April 2016 and proposes values for the three Uplift values ( $\alpha$ ,  $\beta$  and  $\delta$ ) for the year 2017.

## 2 MARKET PRICE CAP (PCAP)

2.1.1 In each of the previous decision papers on PCAP, it was noted that the RAs were satisfied that:

- the various measures put in place to mitigate market power in the SEM (Directed Contracts and the requirement to bid at Short Run Marginal Cost) would limit the need for a cap on wholesale prices as a defence against the abuse of market power;
- the requirement on generators to bid at Short Run Marginal Cost (SRMC) should avoid prices in the SEM from spiking for reasons other than a spike in short run marginal costs (e.g. reflecting a spike in fuel prices) or from a spike in uplift;

2.1.2 There was nonetheless a case for setting PCAP at a conservative level, at least until:

- there was adequate liquidity in the contract market to enable participants to manage risk effectively; and
- there was sufficient certainty that the MSP software does not frequently drive prices to PCAP at times when all load is actually being served.

2.1.3 The RAs therefore decided to set PCAP at a number which was a reasonable multiple of the expected SRMC of the most expensive plant on the system. It was argued that this would:

- allow for variations in SRMC during the year to be reflected in SMP without constraint; and
- reasonably ensure that no generator would be expected to generate at a loss if its SRMC was higher than PCAP.

2.1.4 Thus, since the beginning of the market, the RAs have set PCAP at €1,000/MWh. This level is set to be at a margin above the highest SMP that could be expected in the market in the following year, but not so high as to allow prices to go to excessive levels in the event that the MSP Software fails to determine a price when there is an Insufficient Capacity Event.

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## 2.2 PRICE OUTCOMES FOR THE PREVIOUS YEAR IN THE SEM

2.2.1 In order to propose the value for PCAP for 2017 and to gauge its performance to date, it is instructive to examine prices over the course of the previous year.

2.2.2 Market data for the period from trade dates 1 May 2015 to 30 April 2016 shows that SMP did not exceed 500 €/MWh on any occasion in this period and was between 400 €/MWh and 500 €/MWh on five occasions. Indeed, SMP for this period exceeded 200 €/MWh on only 29 occasions (0.17% of the time).

2.2.3 The table below shows the occurrences of SMP between the explicit price bands:

	May '15 to April '16	
SMP	Occurrences	Percentage
500+	0	0.00%
400 - 500	5	0.03%
300 - 400	2	0.01%
200 - 300	22	0.13%
100 - 200	306	1.75%
70 - 100	1,088	6.23%
50 - 70	3,618	20.71%
0 - 50	12,527	71.70%
<0	0	0.00%

2.2.4 The seven highest SMPs occurring in the period between trade dates 1 May 2015 and 30 April 2016 were as follows:

446.28 €/MWh	10/02/2016	18:00
440.56 €/MWh	22/02/2016	09:30
435.61 €/MWh	14/12/2015	17:00
412.60 €/MWh	17/12/2015	17:30
402.38 €/MWh	04/11/2015	17:30
374.58 €/MWh	23/01/2016	17:30
310.96 €/MWh	04/11/2015	18:00

2.2.5 Uplift has been responsible for spikes in SMP on a number of occasions. Notably it was the main cause of five of the seven highest SMPs over the period. The largest

uplift in any one trading period was 411.94 €/MWh. This occurred in the same trading period as the highest SMP, 10/02/2016 18:00.

- 2.2.6 In the period being considered, the SMP exceeded €200/MWh in 29 trading periods (0.17% of the time). This compares with 109 trading periods (0.62% of the time) in the previous year (May 2014 to April 2015), and 170 trading periods (0.97% of the time) in the May 2013 to April 2014 period.

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## 2.3 EFFECTIVENESS

- 2.3.1 If SMP was frequently being set at PCAP - for reasons other than Insufficient Capacity Events in the MSP software or an inability of the software to reach a feasible solution - then it could be argued that PCAP was set at too low a level and that it was preventing the proper functioning of the price-setting algorithm in the market software.

However, the PCAP has been set at a level sufficiently in excess of the SRMC of the most expensive unit on the system. This allows prices to be set as intended by the MSP software without constraint suggesting that PCAP was effective in achieving its objectives – i.e. allowing for variations in SRMC during the year to be reflected in SMP without constraint and ensuring that no generator would be expected to generate at a loss if its SRMC was higher than PCAP.

- 2.3.2 The analysis above suggests that a PCAP of €1,000/MWh is effective in achieving the objectives of a price cap in the SEM.
- 2.3.3 For the reasons given previously, i.e. the fact that other measures are in place to prevent prices from spiking for reasons other than SRMC bidding and because Insufficient Capacity Events are rarely likely to be declared by the MSP software, the RAs continue to see merit in maintaining the present level for PCAP. Furthermore, in the setting of parameter values in the SEM, the RAs are cognisant of the need for as much certainty as possible for participants operating in the market.
- 2.3.4 The data presented for the year May 2015 to April 2016 above shows that the instance of price spikes and very high SMP is relatively lower than in the period reviewed for the setting of the 2016 PCAP (7 instances where SMP was more than €300/MWh in the May 2015 to April 2016 period compared to 36 instances in the May 2014 to April 2015 period).

- 2.3.5 Coal prices continued the downward trend observed in last year's consultation paper. Over the past twelve months, coal prices have fallen 19% from this time last year. Furthermore, the day-ahead gas price has also decreased by 31%. Carbon prices have also seen a significant reduction with prices for April 2016 24% lower than twelve months ago. In addition to movements in fuel prices, the Euro has remained stable relative to the Dollar but has slightly appreciated relative to Sterling since May 2015. As a result, coal prices are now 19% lower than prices at the same time last year in Euro terms while gas prices have decreased by 34% in Euro terms.
- 2.3.6 Forward fuel prices for the 2016/17 tariff period (note this is the average of the relevant forward fuel prices over April 2016 being referenced here) suggest an increase of 7.9% in gas prices in Euro terms when compared to the average gas price over the last twelve months. Coal prices are forecast to be 5% higher during the 2016/17 tariff period in Euro terms.

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## 2.4 PROPOSAL

- 2.4.1 The SEM Committee proposes to leave PCAP unchanged at €1,000/MWh for 2017.



## 3 MARKET PRICE FLOOR (PFLOOR)

3.1.1 At the conclusion of last year's consultation, the RAs set PFLOOR in the SEM at minus €100/MWh, a level sufficiently below zero to allow for any generators whose short run marginal costs are a negative figure.

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### 3.2 PRICE OUTCOMES SO FAR IN THE SEM

3.2.1 Market data for the period from May 2015 to April 2016 shows that:

- SMP was never below €0/MWh;
- SMP was €0/MWh on 4 occasions in the reporting period. This is the same number of occurrences of €0/MWh as occurred in the previous reporting period from May 2014 to April 2015;
- There has been an increase in the number of trading periods where the SMP was below €50/MWh when compared to the previous period (from 59.4% of the time to 71.7% of the time); and
- No Excessive Generation Events have been called.

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### 3.3 EFFECTIVENESS

3.3.1 If SMP had frequently been set at PFLOOR - for reasons other than Excessive Generation Events in the MSP software – then it might be argued that PFLOOR was set at too high a level and that it was preventing the proper functioning of the price-setting algorithms in the market software.

3.3.2 PFLOOR has therefore been effective in achieving its objectives of minimising exposure of participants to negative prices whilst allowing for an efficient market price signal.

3.3.3 The period examined (May 2015 - April 2016) shows a higher occurrence of prices below €50/MWh relative to the period reviewed for the setting of the 2016 PFLOOR.

3.3.4 Furthermore, an Excessive Generation Event has yet to be declared by the MSP software and prices remain unlikely to go negative, at least in the short term, for reasons other than generator bidding behaviour.

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## 3.4 PROPOSAL

3.4.1 The SEM Committee proposes to leave PFLOOR unchanged at minus €100/MWh for 2017.

## 4 UPLIFT PARAMETERS

4.1.1 As with previous consultations on Uplift Parameter values, the RAs are approaching this consideration of the Uplift Parameters from the perspective of seeking to determine whether there is evidence that change is required, rather than from the perspective of a repeat of the full review process that concluded with the Decision Paper of 15<sup>th</sup> March 2007<sup>2</sup>.

### 4.2 ANALYSIS

4.2.1 The Uplift values<sup>3</sup> calculated over the optimisation time horizon are optimised to meet two objective functions:

1. Minimising Uplift revenues (the cost objective); and
2. Minimising Shadow Price distortion (the profile objective).

4.2.2 These functions are weighted within the optimisation by two Uplift parameters,  $\alpha$  and  $\beta$ . In addition, a third Uplift parameter,  $\delta$ , constrains the overall impact on revenue of the Uplift calculations.

4.2.3 The Code defines that  $\alpha$  and  $\beta$  are complementary, such that  $0 \leq \alpha \leq 1$ ,  $0 \leq \beta \leq 1$  and  $\alpha + \beta = 1$ . The RAs concluded in the decision paper on the determination of the 2015 Uplift Parameters (SEM-14-056) that  $\alpha = 0.1$ ,  $\beta = 0.9$ ,  $\delta = 5$  were the most appropriate Uplift parameters. This was a change from previous periods where  $\alpha$  was set at 0,  $\beta$  set to 1 and  $\delta$  set to 5. The SEM Committee proceeded with this change on the basis that making the change was not a disproportionate response given the potential gains for consumers and the expected minimal change to the market outcomes.

4.2.4 The analysis in the 2015 Policy Parameters Consultation Paper (SEM-14-022) focused on the behaviour of SMP when the Uplift parameter values are changed to  $\alpha = 0.1$ ,  $\beta = 0.9$  for four months – January, April, July and October 2013.

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<sup>2</sup> See <http://www.allislandproject.org/GetAttachment.aspx?id=ed31f7f2-57d3-4a9c-b00d-9150e3fc93c5> for further details

<sup>3</sup> The uplift element of SMP is explicitly designed to cover the costs of start-up and no-load, and is defined such that all price maker generator units should, within each period of continuous operation, recover their scheduled costs of operation from SMP payments (i.e. without resort to make whole payments to individual generators). Uplift is calculated in an optimisation which minimises a weighted sum of total generator revenue and the sum of the square of the uplift price, reflecting the objectives set out in the Code

4.2.5 In considering the Uplift Parameter values for 2017, the RAs have undertaken further statistical analysis to examine the performance of Uplift and to determine whether the relationships between SMP, Shadow Prices and Uplift values have substantially changed from the previous analysis undertaken for the 2016 values.

4.2.6 Specifically, this paper presents analysis from the previous data set from May 2014 – April 2015 for comparison to the May 2015 – April 2016 data set.

#### PREVIOUS DATA SET — MAY 2014 TO APRIL 2015

May 2014 to April 2015			
€/MWh where appropriate	Shadow	Uplift	SMP
Mean	39.41	14.76	54.17
Median	37.95	7.34	46.07
Maximum	330	886.72	955.38
Minimum	0	0	0
Standard Deviation - All Trading Periods	12.27	27.49	32.87
Coefficient of variation	0.31	1.86	0.61

SMP correlated with...	Shadow	Uplift
Correlation	0.59	0.93

#### NEW DATA SET — MAY 2015 TO APRIL 2016

May 2015 to April 2016			
€/MWh where appropriate	Shadow	Uplift	SMP
Mean	36.96	8.03	45.00
Median	36.71	0.00	39.72
Maximum	311.00	411.94	446.28
Minimum	0	0	0
Standard Deviation - All Trading Periods	9.95	16.24	21.15
Coefficient of variation	0.27	2.02	0.47

SMP correlated with...	Shadow	Uplift
Correlation	0.67	0.89

4.2.7 From the above tables it can be seen that there are some changes to the observed data. In particular it is noted that:

- the mean of the Shadow Price, the Uplift and the SMP have all decreased, by 6.2%, 45.6% and 16.9% respectively (broadly in line with fuel price reductions);
- uplift as a percentage of SMP has reduced from 27.2% to 17.9%;
- the standard deviation of the Shadow Price, Uplift and the SMP have decreased by 18.9%, 40.9% and 35.6% respectively;
- the coefficient of variation has decreased for both the Shadow Price and SMP but has increased for Uplift; and
- the correlation between SMP and Shadow Price has increased by 13.8% while the correlation between SMP and Uplift has decreased by 4.2%.

4.2.8 In last year’s consultation the correlation between the SMP and System Demand was analysed between January and April for both 2014 and 2015. The correlation between SMP and System Demand for the period between January and April 2016 is now added for comparison in the table below. There appears to be a continued impact on the SMP profile but it is not excessive.

	Correlation between SMP and System Demand
Jan – Apr 2014	0.55
Jan – Apr 2015	0.46
Jan – Apr 2016	0.44

### 4.3 PROPOSED UPLIFT PARAMETERS FOR 2017

4.3.1 The RAs are minded to leave the current Uplift Parameters unchanged for 2017 as the standard deviation of SMP, Shadow Price and Uplift are significantly lower than the previous period. It had been expected in previous consultations that any changes would increase the volatility of the SMP and, as a result, suppliers risk. This appears not to be the case and hence consumers should benefit from the reduction in Uplift rather than it being negated by any increased SMP volatility.

4.3.2 Based upon the above considerations, the SEM Committee proposes that the values of the Uplift Parameters for the year 2017 should remain unchanged. Therefore:

- $\alpha$  should be set at 0.1;
- $\beta$  should be set at 0.9; and
- $\delta$  should be set at 5.

4.3.3 Lastly, the RAs recognise that a reduced correlation between the SMP and System Demand could lead to negative impacts in the market with regard to having correct price signals for generator and/or interconnector utilisation. However the impact does not appear to be excessive at this stage. The RAs will nonetheless continue to monitor this correlation along with other related indicators.

## 5 PROPOSED PARAMETERS FOR 2017

5.1.1 As detailed in this paper, the SEM Committee proposes to leave the value of the policy parameters for 2017 unchanged as follows:

- PCAP at €1,000/MWh;
- PFLOOR at minus €100/MWh;
- Uplift Parameter  $\alpha$  to be set at 0.1;
- Uplift Parameter  $\beta$  to be set at 0.9; and,
- Uplift Parameter  $\delta$  to be set at 5.

5.1.2 The SEM Committee welcomes the views of interested parties on these proposals. It is intended to publish all responses received. If any respondent wishes all or part of their submission to remain confidential, this should be clearly stated in their response. Comments on this paper should be sent to Kevin Hagan ([khagan@cer.ie](mailto:khagan@cer.ie)) preferably electronically, by close of business on 10 August 2016.

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